

Ocean gales and storms, December, 1929—Continued

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Highest force of wind and direction	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN—Continued													
Sneaton, Br. S. S.	St. Vincent	Cork	22 20 N.	22 56 W.	26	6 p, 26	28	29.96	NE	FSE, 6	E	E, 9	NE-ESE.
Milwaukee, Ger. S. S.	Southampton	New York	45 52 N.	41 20 W.	27	9 a, 27	27	29.16	SE	NE, 12	WNW	NE, 12	
Dosina, Du. S. S.	Rotterdam	Curacao	46 30 N.	46 30 W.	28	7 p, 28	29	29.46	WSW	SW, 10	W	W, 12	WSW-W.
Lubrafol, Belg. S. S.	Amsterdam	Galveston	45 23 N.	17 18 W.	28	2 p, 28	28	29.33	SW	SW, 10	NW	W, 11	SW-W-NW.
Asia, Dan. M. S.	Rotterdam	Alexandria	49 00 N.	4 20 W.	28	4 a, 29	30	29.26	SW	WSW, 10	NW	—, 12	WSW-W.
Milwaukee, Ger. S. S.	Southampton	New York	42 00 N.	60 10 W.	29	8 a, 30	30	29.07	SE	WSW, 11	WNW	—, 12	WSW-W-WNW.
NORTH PACIFIC OCEAN													
Siberia Maru, Jap. S. S.	Yokohama	Victoria	45 50 N.	163 30 E.	1	4 a, 4	4	29.41	NNE	NNW, 8	NNW	NNW, 9	Steady.
Charles H. Cramp, Am. S. S.	Balboa	San Diego	12 54 N.	90 46 W.	2	Noon, 2	3	29.90	N	N, 7	NW	NNW, 8	Steady.
Manoa, Am. S. S.	San Francisco	Honolulu	26 12 N.	149 26 W.	2	11 a, 2	3	29.69	W	NNW, 7	N	NNW, 8	W-NNW.
Pres. Van Buren, Am. S. S.	Honolulu	Kobe	33 50 N.	149 34 E.	3	2 a, 3	3	29.62	NE	NNE	NNE	NNW, 10	Steady.
Erviken, Nor. S. S.	Hong Kong	San Francisco	26 31 N.	120 05 E.	3	4 a, 3	4	30.06	NE	N, 6	NE	NE, 8	N-NE.
William Penn, Am. M. S.	San Pedro	Balboa	14 25 N.	95 23 W.	3	4 p, 3	4	29.87	NNE	NNW, 10	NNW	NNE, 10	NNE-NNW.
Akagisan Maru, Jap. M. S.	Portland	Yokohama	54 24 N.	175 00 W.	3	4 a, 4	4	29.43	SSE	SSE, 9	WNW	SSE, 11	SSE-WNW.
Tsuyama Maru, Jap. S. S.	Yokohama	San Francisco	40 17 N.	151 34 W.	3	Mdt., 4	6	29.35	NNE	SE, 9	SE	SE, 9	SE-S.
Athelmere, Br. S. S.	San Pedro	Yokohama	33 55 N.	174 50 E.	4	4 a, 5	5	29.86	SSE	SW, —	WNW	SSE, 12	
Tejon, Am. S. S.	do	Balboa	15 35 N.	96 20 W.	4	7 p, 4	5	29.95	E	E, 7	NW	N, 8	
Tabchee, Br. S. S.	do	Shanghai	32 54 N.	153 16 W.	5	4 a, 5	6	29.54	WSW	WSW, 7	WSW	W, 10	WSW-W.
Pennsylvania, Am. S. S.	Columbia River	Yokohama	42 36 N.	154 17 E.	5	Noon, 5	6	29.16	ESE	NW, 9	NNW	NW, 10	S-NW.
Olympia, Am. S. S.	Otaru	San Francisco	44 00 N.	155 00 W.	5	10 a, 5	6	29.76	NE	NE, —	NE	NE, 9	ENE-NE.
Do	do	do	44 00 N.	146 00 W.	8	6 a, 8	9	29.36	NE	NE, —	NNW	NE, 9	NE-N.
Pres. Madison, Am. S. S.	Seattle	Yokohama	49 28 N.	176 15 E.	5	9 p, 6	10	29.23	SSW	ESE, 2	WNW	NW, 10	ESE-NW.
Oregon, Am. S. S.	Portland	Shanghai	50 39 N.	137 52 W.	9	11 a, 9	11	29.67	NNE	NNE, 9	NNE	NNE, 9	
Admiral Peoples, Am. S. S.	San Francisco	Portland	41 21 N.	124 36 W.	13	2 p, 13	14	29.79	SE	SE, 8	SSW	SE, 8	
Pennsylvanian, Am. S. S.	New York	Los Angeles	14 30 N.	95 32 W.	19	2 p, 19	19	29.81	N	NNE, 9	NNE	NNE, 10	N-NNE.
Atlanta City, Am. S. S.	Honolulu	Yokohama	21 45 N.	161 35 W.	14	4 p, 14	17	29.76	S	S, 6	NNW	NW, 9	S-SSW.
Oregon, Am. S. S.	Portland	Shanghai	49 55 N.	172 45 E.	20	—, 20	21	29.57	ESE	ESE, 7	W	W, 11	
Pres. Grant, Am. S. S.	Yokohama	Victoria	40 07 N.	150 55 E.	21	10 a, 21	21	28.62	E	NNW, 9	NW	NNW, 12	SW-NNW.
Do	do	do	46 22 N.	168 48 E.	23	8 p, 23	24	29.27	SSE	SW, 8	W	—, 10	SSE-W.
Emp. of Prussia, Br. S. S.	Victoria	Honolulu	46 09 N.	129 25 W.	22	Noon, 22	22	29.67	SW	SW, 8	W	SW, 8	SW-W.
Erviken, Nor. S. S.	Milke	San Francisco	45 55 N.	166 50 W.	21	—, 21	21	29.19	WSW	WSW, 2	W	WNW, 10	WSW-W.
Diana Dollar, Am. S. S.	Yokohama	San Pedro	51 53 N.	153 40 W.	22	12 p, 22	23	29.42	SSE	SW, 9	W	SW, 9	SSE-SSW.
Atlanta Sun, Am. S. S.	Philadelphia	do	13 45 N.	94 03 W.	23	Noon, 23	24	29.99	N	N, —	NNW	N, 10	N-NNE.
Pres. Jackson, Am. S. S.	Victoria	Yokohama	39 58 N.	147 41 E.	25	Noon, 25	26	29.57	W	WNW, 8	WNW	NW, 10	
Oregon, Am. S. S.	Portland	Shanghai	44 58 N.	152 30 E.	25	9 p, 25	26	28.96	NW	N, 12	NW	N, 12	NW-N.
Siberia Maru, Jap. S. S.	Yokohama	Yokohama	51 53 N.	150 32 W.	24	8 p, 27	28	29.26	SE	SW, 7	W	SSW, 10	SSW-WSW.
Havre Maru, Jap. S. S.	Milke	Coos Bay	49 17 N.	144 39 W.	26	4 a, 27	27	29.50	S	SW, 10	SSW	SW, 10	S-SW.
Carlier, Belg. S. S.	Muroran	Vancouver	41 24 N.	154 16 E.	26	—, 26	27	29.50	NW	NW, 8	NW	NW, 9	3 pts.
Oregon, Am. S. S.	Portland	Shanghai	42 55 N.	148 06 E.	27	2 p, 27	27	29.53	W	W, 10	WNW	W, 10	W-NW.
Atlantic City, Am. S. S.	Honolulu	Yokohama	33 00 N.	142 00 E.	27	4 a, 28	29	29.99	SW	SW, 6	NW	NE, 10	S-SW-NW.
Pres. McKinley, Am. S. S.	Victoria	do	50 20 N.	131 50 W.	29	Mdt., 29	30	29.44	SSW	SW, 10	W	SW, 10	SSW-W.
J. A. Moffett, Am. S. S.	La Union	San Pedro	15 45 N.	95 00 W.	28	4 a, 29	29	29.94	NNW	NW, 8	NNE	NW, 8	S-N.
Wilhelmina, Am. S. S.	Portland	Honolulu	29 40 N.	148 40 W.	28	4 p, 31	31	29.82	S	S, 4	SE	ENE, 9	
Nevada, Am. S. S.	Manila	San Francisco	34 50 N.	159 45 E.	31	11 p, 31	Jan. 1	29.28	SSE	SSE, 9	NNW	SSW, 10	
SOUTH PACIFIC OCEAN													
Canadian Leader, Br. S. S.	Sydney	Panama	34 19 S.	154 17 W.	15	5 a, 16	Dec. 15	28.98	N	S, 9	WSW	N, 9	N-W-S.
SOUTH ATLANTIC OCEAN													
Capillo, Am. S. S.	Montevideo	Jacksonville	16 25 S.	36 45 W.	2	10 a, 2	2	29.83	SE	SE, 9	—	SE, 9	SE-SW.
Gustav Schindler, Ger. S. S.	Durban	Dakar	35 10 S.	20 26 E.	2	8 p, 2	3	29.54	WSW	WSW, 8	W	W, 10	WSW-NW.

551.506 (265.2)

NORTH PACIFIC OCEAN¹

By WILLIS E. HURD

During the greater part of the early half of December, 1929, high atmospheric pressure overlay most of the Aleutian region, and it was not until well into the latter half of the month that deep cyclonic conditions prevailed over northeastern waters—28.76 inches at Dutch Harbor on the 27th and 28.82 at Kodiak on the 28th being the minimum readings at land stations. The average for the month showed a shallow depression of 29.75 inches ex-

¹ Cf. Bowie, E. H. The long dry season of 1929 in the Far West Mo. Wea. Rev. 57: 449-451.—Editor.

tending westward from Kodiak to the central Aleutians, at least, and covering the eastern part of the Bering Sea.

Cyclonic conditions prevailed in central latitudes from the 8th to the 17th, after which dates the California-Pacific anticyclone gradually spread out and influenced the weather along a goodly portion of the middle steamship routes. In the waters of the Far East south of the latitude of Japan, strong and extensive high-pressure areas alternated frequently with shallow lows from China.

Barometric data for several island and coast stations in west longitudes, including Point Barrow on the Arctic Ocean, are given in the following table:

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level at indicated hours, North Pacific Ocean and adjacent waters, December, 1929

Stations	Average pressure	Departure from normal	High-est	Date	Low-est	Date
	Inches	Inch	Inches		Inches	
Point Barrow ^{1 2}	30.00		30.62	19th	29.20	28th.
Dutch Harbor ¹	29.75	+0.17	30.36	5th	28.76	27th.
St. Paul ¹	29.75	+0.14	30.44	5th	29.04	24th. ³
Kodiak ¹	29.75	+0.17	30.42	6th	28.82	28th.
Midway Island ^{1 4}	30.11	+0.07	30.34	1st	29.88	5th.
Honolulu ⁵	29.94	-0.08	30.07	6th	29.74	15th.
Juneau ⁵	29.89	+0.10	30.35	17th	29.06	26th.
Tatoosh Island ^{5 6}	29.97	0.00	30.44	27th	29.29	10th.
San Francisco ^{5 6}	30.12	+0.01	30.34	21st	29.84	11th.
San Diego ^{5 6}	30.04	0.00	30.29	21st	29.76	19th.

¹ P. m. observations only.² For 28 days.³ And on other dates.⁴ For 30 days.⁵ A. m. and p. m. observations.⁶ Corrected to 24-hour mean.

December as a whole was a somewhat stormier month than November over most of the upper half of the ocean, although the number of the more violent gales was less. High winds this month were more widespread as to area and days of occurrence and were reported from some locality or other on every day except the 12th. The greatest number of days with gales reported from any 5° square was 8, occurring east of Japan. Data at hand show that steamships encountered full storm to hurricane velocities on four days; on the 4th, in the lower part of the Bering Sea and also a few hundred miles northwest of Midway Island; on the 20th, south of the western Aleutians; and on the 21st and 25th, east of northern Japan. In November there were seven days with wind forces of 11 to 12 on the ocean, latest reports for the month showing that violent gales, not mentioned in the previous review of North Pacific weather, occurred east and northeast of Japan on the 23d, 24th, and 27th.

During the current month wind forces of 8 to 10 were common along the whole length of the northern and much of the middle routes. From the 2d to the 6th a cyclone that prevailed between the Hawaiian Islands and California occasioned much rough weather, with fresh to whole gales, and anticyclonic gales occurred in the same region on the 30th and 31st. On the 13th, 14th, 22d, 24th, and 25th gales were encountered along the Washington, Oregon, and northern California coasts. The maximum wind velocity at Tatoosh Island was at the rate of 57 miles an hour—force 10—from the east on the 13th.

To the westward of the coast region as far as the one hundred and eightieth meridian, north of the parallel of 40°, while frequent gales blew early in the month, the greatest number occurred in the last decade during the days when the Aleutian cyclone was most active. West of the central meridian the frequent gales were due largely to the presence of a fairly permanent cyclonic area—the westernmost extension of the Aleutian Low—south of Kamchatka, and to the activity of a number of cyclones which entered the ocean from Asia. Off the coast of China gales, usually of moderate force but sometimes becoming fresh, were of the northeast monsoon type. These were apparently of greatest severity on the 3d and 4th, when a powerful anticyclone pushed upon the China and Eastern Seas.

The Gulf of Tehuantepec was the scene this month of frequent strong northers. Gales were reported by seamen as occurring here on at least 12 days, on four of which, the 3d, 19th, 22d, and 23d, they attained to whole gale force. Several of these blew over a wide area of sea to the southward, but ceased rather abruptly to the west-

ward of the gulf, as witness the instance of the British motorship *Loch Gail*, which, in lat. 16° N., long. 99° W., on the 19th was experiencing calms and light airs, while a violent Tehuantepecer was blowing south of the isthmus. At Salina Cruz maximum wind velocities from the north, in miles per hour, occurred as follows: On the 3d, 64 miles; 4th and 26th, 56 miles; 29th, 60 miles, these constituting whole gales to storm winds at the head of the bay.

The prevailing wind direction at Honolulu was northeast, whereas in December it is usually east, and the maximum wind velocity was at the rate of 28 miles an hour from the northeast on the 30th.

Over the northwestern part of the ocean scattered fog showed an increase from two days of occurrence in November to five days in December. It was most widespread in area on the 9th, 10th, and 19th. Occasional fog was met with thence eastward to American waters. Along the American coast it was reported on seven days in the vicinity of Puget Sound, on 13 days outside of San Francisco Harbor, and on eight days outside of San Diego. It decreased southward, but occurred on the 11th and 12th in the Gulf of Tehuantepec. Here the American steamship *Corinto* encountered it with a west-south-westerly wind, immediately following a strong norther from west-northwest on the 11th.

TYPHOONS AND DEPRESSIONS IN NOVEMBER, 1929

By Rev. JOSÉ CORONAS, S. J.

Weather Bureau, Manila, P. I.

One Philippine and China Sea typhoon and one Pacific typhoon.—There were only two well-developed typhoons noticed over the Far East during the month of November, one of them having traversed the Philippines through the Visayan Islands and the Sulu Sea on the 10th and 11th.

This Philippine typhoon was probably formed on the 8th in very low latitude to the southwest of Pelew Islands near 132° longitude E. and 5° latitude N. It moved northwestward on the 8th and inclined to WNW. on the 9th, reaching the Philippines near to the north of Surigao during the night of the 9th to 10th. In the morning of the 10th it moved NNW. for a few hours, and then it took a westward direction in the afternoon of the same day. This west direction was kept until the 12th when it began to move again to WNW. in the China Sea.

While traversing the Visayan Islands, this typhoon appeared to be only a shallow depression of little importance; but it began to develop more in the Sulu Sea and became a much developed and severe typhoon in the China Sea. The steamer *Calchas* passed through its center at 3:30 p. m. of November 14 in 112° 07' longitude E. and 13° 57' latitude N. The barometric minimum recorded at that time was as low as 28.38 inches (720.84 mm.), the winds blowing from ENE. force 9 before the minimum and from SW. force 9 to 10 after the minimum. The captain of the steamer describes thus the passing of the center:

In the central area, we noticed many land birds including a wild duck. The sun shone clearly for a period of about 20 minutes. The wind was light and variable, and the sea was very rough and confused (pyramidal).

The approximate positions of the center at 6 a. m. of November 8 to 15 were as follows:

November 8, 6 a. m., 132° 15' longitude E. 5° 25' latitude N.
 November 9, 6 a. m., 129° 45' longitude E., 7° 45' latitude N.
 November 10, 6 a. m., 124° 25' longitude E., 10° 30' latitude N.